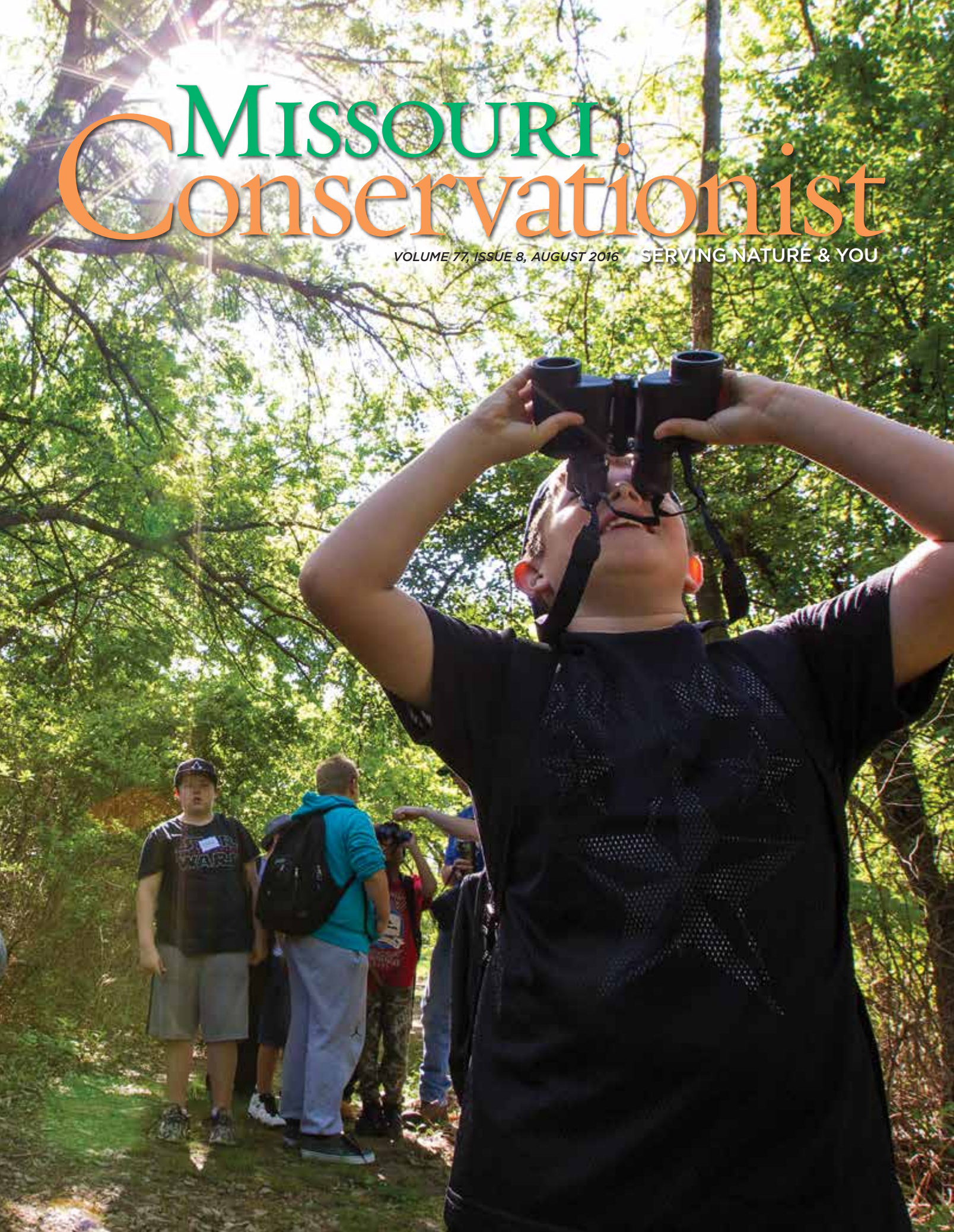


Missouri. Conservationist

VOLUME 77, ISSUE 8, AUGUST 2016 SERVING NATURE & YOU



[NOTE TO OUR READERS]

Endless Outdoor Adventures Await You

Some of my earliest outdoor adventures were with my family and friends. I was fortunate to grow up in a family of outdoor enthusiasts. We relished spring turkey season, spent the summer floating crystal

clear Ozark streams, hunted squirrels under hickory trees in August, and fished for crap-pie in the dead of winter. Today, my boys are blessed with the same outdoor experiences.

The Department can definitely help if you want to learn more about the Missouri outdoors. Each year the Department offers over 1,000 Discover Nature courses, hunting classes, and fishing clinics for individuals of all ages. There is still time to sign up for bird watching field trips, frog gigging clinics, fishing classes, and other outdoor skills classes. The Department's updated website has a user-friendly *Events* page that lists a variety of upcoming Department activities. Late summer is a great time to sign up for a hunter education class. Make the course an adventure and go as a family, or take a group of kids from the summer baseball or softball team.

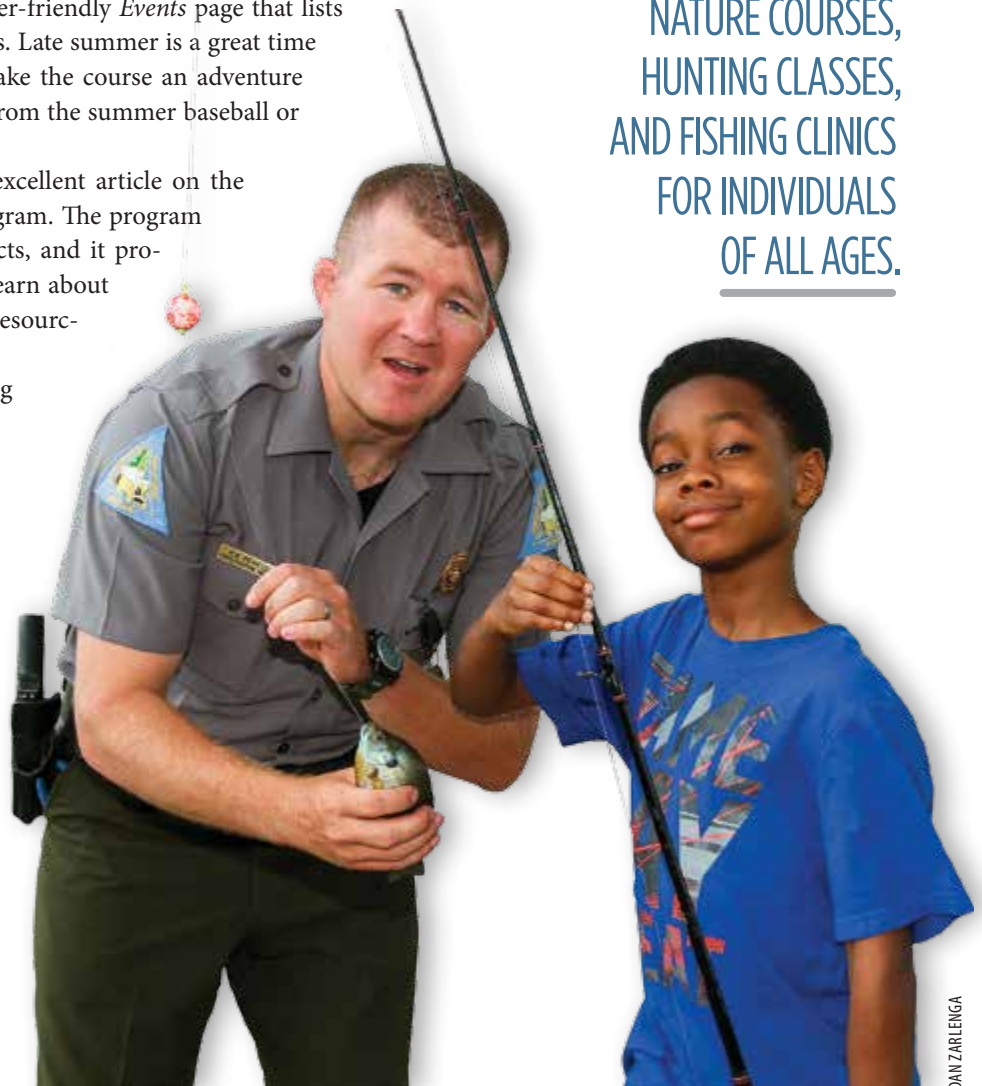
This month's *Conservationist* has an excellent article on the Department's Discover Nature Schools program. The program is in 100 percent of Missouri school districts, and it provides youth of all ages the opportunity to learn about our state's valuable fish, forest, and wildlife resources and the benefits of wise management.

Department nature centers, shooting ranges, and conservation areas also provide citizens an opportunity to experience the outdoors. This month's *Conservationist* highlights a few unique conservation areas around the state. With over 1,000 conservation areas, 75 public shooting ranges, and 13 nature and interpretative centers around the state, your Department of Conservation is close to home. The Department's website can help you find the place you're looking for. Browse it at mdc.mo.gov.

Get out and start your own Missouri outdoor adventure.

—Aaron Jeffries, deputy director

EACH YEAR THE
DEPARTMENT OFFERS
OVER 1,000 DISCOVER
NATURE COURSES,
HUNTING CLASSES,
AND FISHING CLINICS
FOR INDIVIDUALS
OF ALL AGES.



DAN ZARLENGA

FEATURES

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by Bonnie Chasteen

Conservation partners work to safeguard Missouri's sensitive caves, groundwater, and wildlife

18 **Quail Hunt at Cover Prairie**

by Scott Sudkamp, photographs by David Stonner

A trip to this quail emphasis area takes you back to Missouri's quail-hunting good old days

25 **Discover Nature Schools**

by Dan Zarlenga

A winning program for Missouri teachers, students, and the future of conservation

Cover: Students from Forder Elementary School hike at the Claire Gempp Davidson Memorial Wildlife Area in St. Louis to work on their Discover Nature Schools unit. Photograph by David Stonner.

📷 16–35mm lens • f/13 • 1/20 sec • ISO 200

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WHAT IS IT?

Our photographers have been busy exploring the intricacies of outdoor Missouri. See if you can guess this month's natural wonder. The answer is revealed on Page 8.



UP A LAZY RIVER

I read with great interest *Up A Lazy River* by Jim Low [July; Page 25]. While I've had a subscription to the *Missouri Conservationist* since moving to Missouri in 2016, I've just completed the four Discover Nature — Fishing classes at James A. Reed Memorial Wildlife Area's Prairie Hollow Lake in Lee's Summit. I bought a Lifetime Fishing and Trout Permit and poured over the article, while looking at maps, learning about different fish species, lures, and various locations planning a novice's first fishing expedition out of the Kansas City area.

Ed Marrow, Liberty

FLOATIN'

I took my 8-year-old grandson, Matthew, on his first overnight float trip — an 18-mile, two-day adventure on Flat Creek in southwest Missouri. I wanted to share with him the thrill of paddling through a fast-moving rapid or drifting through a quiet pool, watching a smallmouth bass leap

clear of the water while shaking on the end of your line, watching a great blue heron take flight from a massive sycamore tree with its distinctive squawk, or just looking down into the clear water and watching the underwater world pass beneath as you drift along. But, most of all, I wanted to get him hooked on the lure of an Ozark stream and the experiences that an overnight float trip has to offer.

Before sunrise the next day, we got the fire going. I noticed Matthew wasn't by the fire. Instead, he was standing at the water's edge, fishing pole in hand, silhouetted by the morning sky, already fishing. I thought, he's hooked, and we may have to do a three-day float next time.

Thank you MDC for your part, providing good accesses, clear streams, and healthy fish populations. In the meantime, I will try to do my part to show future generations how good a float on a Missouri stream can be.

Randy Evans, Monett

GRATEFUL

I have fished and hunted all my life, and I want to thank MDC. I have seen otters and turkeys where I've never seen them before, good populations of beaver, muskrat, mink, and bobcat. I've also seen plenty of wood ducks and owls. I am really grateful for what the Missouri Department of Conservation is doing for all of our wildlife. Keep up the good work.

Bradley Cupp, via Facebook

Kudos to our Missouri Department of Conservation for managing our wild turkey population to be the best place on the planet to hunt for wild turkeys. As I was reviewing the 2016 wild turkey harvest in Missouri, I was astounded by the number of counties that bagged over 400 birds. Out of 114 counties, 61 exceeded the 400 mark. I am proud that MDC protects and manages the fish, forest, and wildlife resources of our state, and how they facilitate and provide opportunity for all citizens to use, enjoy, and learn about these resources.

Dan Fuller, via Facebook



Reader Photo

A POOSEY SUNSET

Dianna Reed of Hamilton took this photo of the setting sun at Poosey Conservation Area in Livingston County. "My husband and I had been bass fishing out of our boat on Indian Creek Lake," said Reed. "The fishing had been good that day, and we were on our way back to the boat dock, and the sunset was just beautiful." She said she and her husband visit the area frequently to camp, fish, hunt, and hike. "We haven't bowfished for carp there yet, but hope to try it out soon," said Reed. She said they also enjoy hunting at nearby Gallatin Conservation Area and fishing for catfish on the Grand River at Holmes Bend Access.

TYPES OF TERRAIN

I have been a Missouri resident since 1948. I have been reading the *Missouri Conservationist* for many years. It is one of the best such magazines in the U.S.

I have been outdoors many years, rafting, fishing, hunting, and hiking, and have seen many kinds of terrain. In the magazine, I see reference to savanna, prairie, glade, etc., but I don't know what they are and I would guess that many others don't know either. Could your experts prepare an article? It could have a description of each type of terrain and with the help of the photographers, a photo of each type.

Frank S. Thomas III, Ballwin

Editors' Note: The Missouri Conservationist is starting a six-part series with this issue that will cover the various terrains in Missouri. The series will cover caves and karst [August], forests and woodlands [November], wetlands [December], rivers and streams [February 2017], glades [April 2017], grasslands/prairies/savannas [July 2017].



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"Every time the summer Olympics roll around, he drags out that story about the time he beat the hare."

Agent Notes

Leaving a Legacy

MOST OF US were introduced to the sport of hunting by a family member or friend. My dad introduced me to duck hunting when I was 6 years old. The experience from those early hunting trips is the reason I hunt today. It's also why I make it a priority to share the hunting experience with new hunters.

Somebody once told me it takes a hunter to make a hunter. Hunter recruitment is a responsibility of all sportspeople. With the fall hunting seasons quickly approaching, consider taking a friend, neighbor, or a family member with you. By mentoring a new hunter, you will create memories, help them put food on their table, and build a legacy that will hopefully last a lifetime.

Hunting is part of our national heritage. It's an opportunity to spend time with family and friends, put food on the table, and build lasting memories. Good luck this hunting season!

Marc Bagley is the conservation agent for Carroll County. If you would like to contact the agent for your county, phone your regional conservation office listed on Page 3.



Operation Game Thief

Help put game thieves out of business. If you see a possible violation in progress, call your county conservation agent immediately or dial the toll-free number below:

1-800-392-1111

All information is kept in strict confidence. Desirable information includes names of violators, vehicle description, and license number, as well as the violation location.

HUNTING & FISHING CALENDAR

FISHING	OPEN	CLOSE
Black Bass		
Impounded waters and most streams north of the Missouri River	All year	None
Most streams south of the Missouri River	05/28/16	02/28/17
Bullfrogs and Green Frogs	06/30/16	10/31/16
Nongame Fish Giggling		
Impounded Waters		
sunrise to sunset	02/01/16	09/14/16
sunrise to midnight	09/15/16	01/31/17
Streams	09/15/16	01/31/17
Paddlefish on the Mississippi River	09/15/16	12/15/16
Trout Parks		
Catch-and-Keep	03/01/16	10/31/16
Catch-and-Release	11/11/16	02/13/17
HUNTING	OPEN	CLOSE
Coyote (restrictions apply during April, spring turkey season, and firearms deer season)	All year	None
Deer		
Archery	09/15/16 11/23/16	11/11/16 01/15/17
Firearms		
Early Youth Portion	10/29/16	10/30/16
November Portion	11/12/16	11/22/16
Late Youth Portion	11/25/16	11/27/16
Antlerless Portion (open areas only)	12/02/16	12/04/16
Alternative Methods Portion	12/24/16	01/03/17
Doves	09/01/16	11/29/16
Groundhog (woodchuck)	05/09/16	12/15/16
Pheasant		
Youth	10/29/16	10/30/16
Regular	11/01/16	01/15/17
Quail		
Youth	10/29/16	10/30/16
Regular	11/01/16	01/15/17
Rabbit	10/01/16	02/15/17
Sora and Virginia rails	09/01/16	11/09/16
Squirrel	05/28/16	02/15/17
Teal	09/10/16	09/25/16
Turkey		
Archery	09/15/16 11/23/16	11/11/16 01/15/17
Firearms		
Fall	10/01/16	10/31/16
Waterfowl	see the <i>Waterfowl Hunting Digest</i> or short.mdc.mo.gov/ZZx	
Wilson's (common) snipe	09/01/16	12/16/16
Woodcock	10/15/16	11/28/16

For complete information about seasons, limits, methods, and restrictions, consult the *Wildlife Code* and the current summaries of *Missouri Hunting and Trapping Regulations* and *Missouri Fishing Regulations*, *The Spring Turkey Hunting Regulations and Information*, *the Fall Deer and Turkey Hunting Regulations and Information*, *the Waterfowl Hunting Digest*, and *the Migratory Bird Hunting Digest*. For more information, visit short.mdc.mo.gov/ZZf or permit vendors.

Ask MDC

Address: PO Box 180, Jefferson City, MO 65102-0180
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Green heron

What bird is this?

It's a green heron, one of the few birds that have mastered the art of floating things like feathers, twigs, and insects to attract the curiosity of hungry fish. Once the fish's attention is captured, this patient bird will snatch it from the water with a quick jab of its dagger-like beak.

You can expect to see these summer breeding residents of Missouri near ponds, marshes, rivers, and reservoirs. For more information visit allaboutbirds.org/guide/Green_Heron/id.

I have a healthy population of western painted turtles around my pond. Although a few of their nesting attempts appear successful this year, most have been pillaged, as evidenced by the egg shells strewn around my yard. Recently I found another old girl in the later stages of making her

nest. Should I try to protect this nest from predators? Also, how can I tell if a nest hatched successfully or was pillaged?

It's best to let nature take its course. However, some people will protect nests by placing a wire mesh frame over the top of the nest, especially in areas with overpopulated predators.

Each living thing in an ecosystem is part of multiple food chains, and western painted turtles are no exception. This omnivorous generalist turtle survives by eating aquatic plants, snails, crayfish, many insects, and occasionally fish. But their eggs also serve as a source of nutrition for animals higher on the food chain, such as coyotes, foxes, and raccoons.

The animals that prey upon the nests near your pond most likely have young, too, so they are simply trying to survive.

It sounds as if you do, indeed, have predators in the vicinity. Typically,

when the hatchlings dig out, they leave their shells behind underground. If you see scattered bits of eggshell on the surface, it's a sign the eggs were dug up and predated.

We bought a wood-burning stove. It hasn't been used recently, and when I opened the door, I found four dead bluebirds. They had flown down the chimney and couldn't find their way out. How can I prevent this from happening again?

Chimneys can become nesting places for several cavity-dwelling species, including chimney swifts and eastern bluebirds. Unfortunately, this can become a big problem for both humans and birds alike, especially when an abandoned nest provides unwanted fuel for a flue fire or a bird dies after becoming disoriented in the dark.

Fortunately, it is very easy to bird-proof your chimney with a chimney cap.

A metal mesh cap — often made of galvanized or stainless steel — won't hinder smoke from escaping, but will prevent small birds and rodents from entering. Chimney caps typically are boxes with solid tops and mesh sides. Various types of caps — some with mesh screening and other with metal bands — are available and can save birds' lives.

For an open fireplace, lock-top dampers are the best because they effectively block not only birds, but also insects, rodents, and moisture. They also improve a home's energy efficiency.

It's important to schedule the installation of a chimney cap when birds are not nesting because it is illegal to remove the nests and eggs of migratory birds.

Chimneys aren't the only man-made structures that pose challenges for birds. Any vertical cavity — fence posts, dryer vents, clothing lines — also can trap unsuspecting birds.



Mourning dove

Dove Season Opens Sept. 1

With dove hunting season opening Sept. 1, the Missouri Department of Conservation reminds dove hunters of its more than 180 conservation areas around the state that allow dove hunting. Nearly 100 of these are planted in multiple crop fields that attract the popular game birds. Crops include sunflower, corn, millet, wheat, and buckwheat.

Mourning doves, Eurasian collared doves, and white-winged doves may be taken from Sept. 1 through Nov. 29 from one-half hour before sunrise to sunset with a combined daily limit of 15 and a combined possession limit of 45 for all three species.

Get more info on dove hunting — including permit requirements, places to hunt, and recipes — at short.mdc.mo.gov/ZZt. Information on dove hunting is also available through the Conservation Department's *2016 Migratory Bird Hunting Digest*, available where hunting permits are sold, at Department offices, nature centers, and online at mdc.mo.gov.

Department and Partners Provide Mentored Dove Hunts

Interested in dove hunting but have never given it a try? Sign up for a mentored hunt on one of 12 fields across the state. The Missouri Department of Conservation in partnership with the National Wild Turkey Federation, Quail Forever, Quail and Upland Wildlife Federation, the Missouri Prairie Foundation, and private landowners will provide the hunts primarily located on private land. Field locations will be in or near Cape Girardeau, Chillicothe, Joplin, Kahoka, Lynchburg, Marceline, Mokane, Paris, Pittsburg, Rolla, Ste. Genevieve, and Washington.

There will be three hunts offered on each field including one on opening day of dove season, Sept. 1, and then two other days with dates to be determined. Field assignments will be determined on a first-come, first-served basis. First-time hunters can attend multiple hunts as registration space permits.

Each participating new hunter will be assigned

Mourning doves, Eurasian collared doves, and white-winged doves may be harvested during Missouri's dove hunting season.

a mentor, and pre-hunt workshops will provide basic hunter safety in addition to information about dove biology and management, the importance of hunters and hunting, and the opportunity to practice shooting a shotgun. Participants are encouraged to attend a dove hunting workshop or hunter education prior to participating in a hunt.

Register for the mentored dove hunts at tinyurl.com/nuv6gos. For more information on Conservation Department dove hunting workshops, visit mdc.mo.gov/events. To get more information on hunter education, visit short.mdc.mo.gov/ZkY.

For more information, contact John Burk at 573-676-5994 or jburk@nwtf.net, or Elsa Gallagher at 660-277-3647 or EGallagher@quailforever.org.

Commission Names Deputy Director Draper Department Interim Director

The Missouri Conservation Commission has named Missouri Department of Conservation Deputy Director Tom Draper as interim director of the state conservation agency effective July 16. The temporary appointment came after the announcement in early June that Department Director Robert Ziehmer is stepping down as agency director effective July 15 to continue his conservation career through a new endeavor in the private sector.

"The Commission unanimously and enthusiastically supports Interim Director Draper," said Commission Chairman Dave Murphy. "The Commission is confident in his abilities to continue to



The Missouri Conservation Commission has named Missouri Department of Conservation Deputy Director Tom Draper as interim director of the state conservation agency.

advance this agency and its services to meet the needs of Missourians and to protect and promote the fish, forest, and wildlife resources of the Show-Me State."

Draper has served the Department as deputy director of Resource Management and as chairman of the Regulations Committee since 2010. Prior to that, he was a regional supervisor in the Department's Forestry Division.

The Conservation Commission is developing search criteria and a nationwide recruitment effort for the agency's director position.



CONSERVATION COMMISSION ACTIONS

The June Commission meeting featured presentations and discussions regarding the research and proposal process, smallmouth bass and rock bass/goggle eye proposed regulations update, major construction projects status report, information technology projects status report, current financial summary, future leadership and professional development, and area plan update. A summary of actions taken during the June 23–24 meeting for the benefit and protection of fish, forests, and wildlife and the citizens who enjoy them includes:

- » **Approved** regulations related to feral hogs and regulation changes identified during the annual review of the *Wildlife Code of Missouri*.
- » **Approved** the Department's Fiscal Year 2017 Internal Expenditure Plan.
- » **Approved** the sale of 0.06 acre and grant of a temporary construction easement on 0.2 acre of Sheridan Access in Worth County to the State of Missouri, acting by and through the Missouri Highways and Transportation Commission, for a bridge-replacement project.
- » **Approved** the purchase of 92 acres, and accepted the donation of an adjoining 48 acres in Dade County as a new conservation area, named Corry Flatrocks Conservation Area.
- » **Approved** the purchase of 0.72 acre in Ripley County known as T.L. Wright Memorial Access from The T.L. Wright Lumber Company.
- » **Announced** the appointment of Deputy Director Tom Draper as interim director, effective July 16.
- » **Elected** the following Commission Officers: David W. Murphy, chair; James T. Blair, IV, vice chair; and Marilyn J. Bradford, secretary.

The next Conservation Commission meeting is Aug. 25–26. For more information, visit short.mdc.mo.gov/ZZe or call your regional Conservation office (phone numbers on Page 3).



Cool Catch

Caleb McGuire caught this 16-pound piebald blue catfish in June using a trotline on the Missouri River in Saline County. After snapping a few pictures, he released it. Sons Cole and Cash joined Caleb and his unique catch for this picture. Piebald animals are uncommon and have patterns of pigmented spots on an unpigmented (white) background of hair, feathers, skin, or scales.

(continued from Page 7)

Take Hunter Education Course Now

Fall deer, turkey, migratory game bird, quail, and waterfowl hunting seasons are coming up and most hunters are required to have hunter education certification. Missouri's Hunter Education Course is required for anyone born on or after Jan. 1, 1967, and buys a firearms season hunting permit, or any person age 11 to 15 who hunts alone.

Hunter Education teaches hunting safety, skills, and ethics, and includes lessons on wildlife conservation and management. The course is divided into a knowledge section and a skills session, which includes an exam. Participants must complete both the knowledge and skills portions to become certified.

The Department provides several ways to become hunter-education certified. Participants can complete the knowledge section through an online study program, a hard-copy study guide, or a four-hour classroom session.

Learn more about Hunter Education and register at short.mdc.mo.gov/ZkY.

Hunter Education has reduced hunting incidents and deaths in Missouri by more than 70 percent since it became mandatory in 1987.

Missouri State Fair Aug. 11–21

Discover nature with the Missouri Department of Conservation at the Missouri State Fair in Sedalia Aug. 11–21. Visit the Conservation Building from 9 a.m. to 9 p.m. daily to see aquaria

full of live fish and other aquatic wildlife along with displays of other live native animals such as snakes, turtles, and amphibians. Ask conservation questions of Department staff, get educational materials, and have fun.

Check out the Department's air-conditioned Conservation Kids' Discovery Room between 10 a.m. and 6 p.m. to have hands-on fun discovering nature through crafts and other activities.

Enjoy conservation-related demonstrations at the Department's outdoor pavilion.

- See a live eagle and other birds of prey up close at the **Raptors of Missouri** presentation Aug. 11 and Aug. 20 at 11 a.m., 1:30 p.m., and 4 p.m.
- Learn how to prepare fresh catch at the **Fish Cooking and Cleaning** lesson Aug. 12 and Aug. 13 at 11 a.m. and 1:30 p.m.
- Learn about black bears in Missouri and how to **Be Bear Aware** Aug. 14 and Aug. 21 at 11 a.m. and 1:30 p.m.
- Learn more about Chronic Wasting Disease, what the Department is doing to limit the spread of this deadly deer disease, and what hunters and others can do to help at **Missouri's Deer Herd: CWD Updates** Aug. 15 at 11 a.m. and 1:30 p.m.
- Discover what makes bees, butterflies, and other pollinators so important at **The Buzz About Insect Pollinators** Aug. 16 and Aug. 17 at 11 a.m. and 1:30 p.m.
- Find out how to stop exotic invasive plants and animals threatening the state at **Alien Invaders in Missouri!** Aug. 19 at 11 a.m. and 1:30 p.m.

One animal that will no longer be at the State Fair is Peanut the Turtle. The large red-eared slider with the misshapen shell is the mascot for the state's No More Trash antilitter campaign. Peanut has been a regular attraction at the fair for years. Due to health issues with his shell and his advancing age, Peanut has been retired from traveling and now resides fulltime at the Department's Powder Valley Conservation Nature Center in Kirkwood. Eliminating the stresses of traveling will help maintain his health.

For more information on other Department events, visit mdc.mo.gov/events.



WHAT IS IT?

Differential Grasshopper | *Melanoplus differentialis*

The differential grasshopper is relatively large, growing up to 2 inches, and may be green, brownish-green, or olive green. The femurs of the hind legs have a black herringbone pattern, and the tibiae are usually yellow with black saw-toothed spikes. It's found statewide in a wide variety of habitats, including open fields, gardens, grasslands, meadows, prairies, roadsides, and land along ponds and streams. It has become a pest of many food crops, including corn, soybeans, alfalfa, cotton, vegetables, small grains, and the leaves of fruit trees. Adults can travel up to 10 miles in a day in search of food. Mating takes place late in the summer or early fall. Females are capable of laying up to eight egg masses, containing 25 eggs each. The eggs overwinter, and the nymphs emerge the following spring. It takes the nymphs two months to reach adulthood. —photograph by Noppadol Paothong

DID YOU KNOW?

We help people discover nature.

Hog Hunting Banned on Department Land Starting Sept. 30

The Missouri Conservation Commission recently approved changes to the *Wildlife Code of Missouri* that prohibit the hunting of feral hogs on conservation areas and other lands owned, leased, or managed by the Missouri Department of Conservation. The new regulation prohibiting hog hunting does not apply to private property.

The Commission's decision followed consideration of feedback received during a public comment period on the topic that ended in May. The effective date of the regulation change will be Sept. 30. Potential penalties for illegal hog hunting could include fines and the loss of hunting privileges.

The Department discourages feral hog hunting in Missouri. Research from other states shows hog hunting increases feral hog numbers and locations because it provides incentives for illegal releases of hogs for future hunting. Releasing hogs to non-enclosed areas or to the wild is illegal in Missouri. The Department encourages the public to report these types of illegal activities to local conservation agents.

Instead of hunting hogs to help reduce their numbers, the Department encourages hunters and others to report feral hog sightings to their local conservation agents or regional offices. Staff can then confirm local numbers and locations, and determine how best to capture and eliminate the entire group of feral hogs.

The Department owns or manages about 1,000 conservation areas around the state with about 30 known to have feral hogs, mostly in southern Missouri. According to Wildlife Division Chief Jason Sumners, hog hunting on conservation areas interferes with efforts by Department

Discover Nature Schools Program Works for Students

- » Our **Discover Nature Schools program** features hands-on outdoor learning and helps Missouri students from preschool through grade 12 become lifelong conservationists.
- » Students in outdoor learning programs **perform better on standardized tests** and earn higher grade-point averages in science, language arts, and math.
- » Full-color Discover Nature Schools instructional units **meet Missouri's grade-level expectations** and include a teacher guide, student book, and science notebook.
- » **Parents, teachers, homeschoolers, and school districts** can download and review the preschool, primary, elementary, middle, and high school instructional units at short.mdc.mo.gov/ZZ4.
- » Participating teachers and schools can also receive **Discover Nature Schools training and funding** for equipment.
- » To launch a Discover Nature Schools program in your school or class, **contact your local education consultant** via your regional office (find phone numbers on Page 3). They can introduce you to the units, register you for training, and help you get started.
- » The annual **Discover Nature Schools Science Fair** helps participating schools win recognition and equipment for outdoor learning. Find more details at short.mdc.mo.gov/ZZU.
- » In the spring, **schools can visit our online falcon camera** at short.mdc.mo.gov/ZZJ and use study guides to observe the falcon family's activities. Check out our falcon camera education material at short.mdc.mo.gov/ZZo.

staff to trap and eliminate entire groups of feral hogs, called sounders.

"The regulation change prohibiting hog hunting on conservation lands is a direct result of some misguided individuals disrupting trapping efforts by Department staff," Sumners explained.

"Staff set large, corral-type traps on areas where there are known feral hogs. They then bait the area with corn for several days or weeks to attract the targeted group of hogs, get them used to the surroundings, and get them concentrated in the

trap before triggering it. This work takes weeks, with the goal being to trap the entire group of hogs. After weeks of work to catch the sounder (family group) of hogs, we then get an individual who finds out about the site, shows up at some point, and shoots a hog or two. The rest of the group then scatters and moves to a new location. As a result, weeks of work have been wasted and new areas now have feral hogs."

Feral hogs are an invasive, nuisance species in Missouri and are not wildlife. They cause significant damage to wildlife habitats, compete with native wildlife such as deer and turkey for food, prey upon native wildlife such as turkey and quail, destroy natural areas along with agricultural lands, pollute ponds and streams, and spread diseases to domestic livestock and people. For more information on feral hogs, visit mdc.mo.gov/feralhog.



These destructive feral hogs pollute a pristine spring in Ozark County.



NOPPADOL PAOTHONG

S of the

BY BONNIE CHASTEEN





Outside the new Bat Cave gate, which protects cave life from vandalism, researchers prepare to conduct monitoring activities.



Little brown bat

Karst.

It isn't a word you hear every day, but it's the most common kind of geology found in Missouri. Karst is a region of porous limestone containing deep fissures and sinkholes. It also has underground caves and streams, and it's where much of our drinking water collects, gets filtered, and flows. Karst is also a special kind of habitat that many kinds of native plants and animals can't live without.

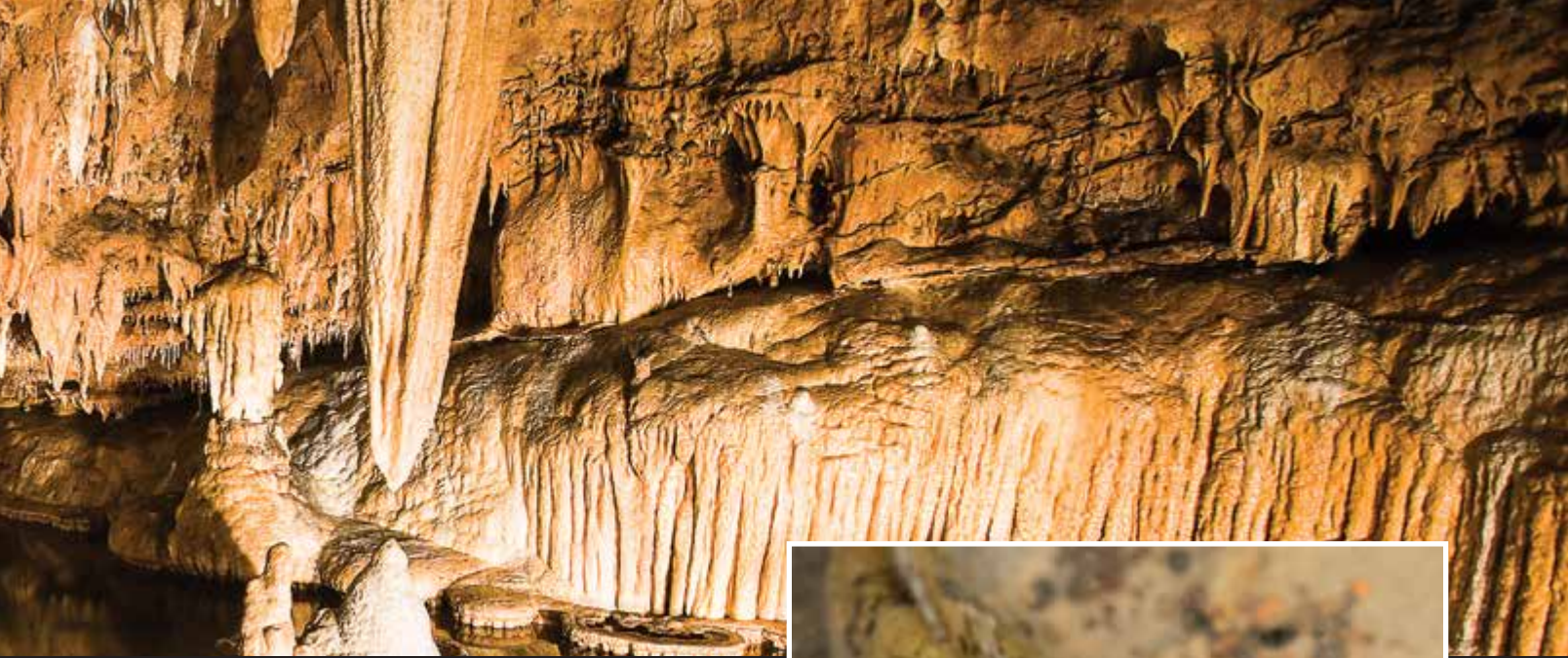
To help keep Missouri's critical karst and cave habitat healthy, the Department is working with a wide range of partners at several locations. Following are just a few of the many cave and karst conservation projects underway.

Gathering to Gate the Bat Cave

Bat Cave in Shannon County is the third largest gray bat hibernaculum in Missouri. Every October, up to 60,000 bats gather there to conserve energy for the winter. Bat Cave is also critical habitat for the endangered Indiana bat. Other species known to hibernate in this cave are the little brown bat, eastern small-footed bat, tri-colored bat, big brown bat, and the now federally threatened northern long-eared bat.

The property, which has become part of Sunklands Conservation Area, lies next to Current River State Park and is within view of the National Park Service Ozark National Scenic Riverways (ONSR).

ONONDAGA CAVE: DAVID STONNER; BAT CAVE GATE: SHELLY COLATSKIE;
LITTLE BROWN BAT: JIM RATHER



Onondaga Cave



Livestock fencing and alternative water sources help farmers protect sensitive karst species like the federally endangered grotto sculpin.

The cave's location on a busy recreation route and its large opening above the Current River made it an easy target for vandalism, even after managers fenced it. In 2012, partners from several organizations constructed a proper, bat-friendly cave gate, which is now the largest standing cave gate in the United States.

"It takes partnerships like this to pull off big projects that can truly protect important cave sites," Resource Scientist Tony Elliott said.

Missouri Department of Conservation led the project with support from a U.S. Fish and Wildlife Service (USFWS) White-Nose Syndrome Grants to States award. Other conservation partners include AmeriCorps, Karst Solutions (Jerry Fant and crew), Missouri Department of Natural Resources State Parks Division, ONSR, and The Nature Conservancy.

Keeping Cattle Out of the Spring

Perry County is a sinkhole plain with many karst features such as caves and losing streams. (See illustration on Page 17.) It is also home to the only known populations of grotto sculpin, a federally endangered fish. Protecting this rare cave-dwelling fish depends on protecting its sensitive karst habitat and improving water quality.

Much of the Perry County karst region is privately owned, so conservation partners work closely with landowners, providing technical assistance and cost-share funds, hosting workshops, and monitoring the area's valuable karst resources.

Recently, conservation partners took part in a landowner-assistance project to improve spring health and increase efficiency and cleanliness of livestock watering. The project's objective was to divert spring water through

a gravity-fed system and into a livestock watering tank, which, when full, overflowed back into the spring branch. In addition, partners fenced the spring and its branch to exclude livestock access.

"This project is a win-win for karst habitat and for the landowner," said Department Fisheries Biologist Jason Crites. "The spring has been protected from the livestock, and the livestock now have a clean, reliable drinking water supply."

In addition to the Department, conservation partners include the Farm Service Agency (FSA), Natural Resources Conservation Service (NRCS), and USFWS.

Habitat **HEROS**



With the Department's help, landowners Laura and Kevin Hayden pulled nearly 1,300 old tires from large sinkholes on their Perry County farm.

Cleaning Up the Old Sinkholes

Sinkholes form when underlying limestone dissolves or caves collapse. Many of the sinkholes located in Perry County have historically been used as dumps for household trash, tires, appliances, and herbicide containers. This trash can break down, leach into the underground water supply, and degrade water quality. Landowners like Laura and Kevin Hayden of Perryville have been eager to clean up and restore sinkholes on their land.

Laura's family has raised cattle on their farm for more than 150 years. Their land has several sinkholes, some quite large. "Grandpa was always putting tires and other items into the sinkholes to make them safer for the cattle," Laura said. "Sometimes a young calf would fall in a hole and have to be rescued."

Kevin said he and Laura awakened to the need for cleanup when agencies began monitoring water quality for the grotto sculpin. "Brad Pobst, a Department private land conservationist, showed us the water quality results for our land, and they weren't good," Kevin said.

With this news, the Haydens wanted to do what they could to clean up the sinkholes. Not long after, Kevin and Laura met Department Fisheries Biologist Jason Crites at one of the early community meetings about grotto sculpin management, and they gave him a call. "Jason let us know there were funds and help to clean up the sinkholes, and we started our first project."

With Department help, the Haydens pulled nearly 1,300 tires out of the sinkholes and disposed them in a permitted landfill. Then they fenced off the sinkholes, and they're continuing to work with Jason to establish native warm-season grass buffers designed to filter stormwater.

"It sure makes us feel better to do this work, but we could never get it all done by ourselves. We've made a lot of changes in Perry County — fenced cows out of the streams and planted buffers. People want to make a difference, and guys like Brad and Jason are here to help us do it."

In addition to the Haydens and the Department, conservation partners include FSA, NRCS, and USFWS.



Virginia sneezeweed

Recovering Threatened Species

In the Missouri Ozarks, Virginia sneezeweed, a federally threatened plant known only in Missouri and Virginia, is associated with sinkhole ponds as well as low wet meadows and swales occurring in karst areas. It also serves as a nectar source for native pollinators such as butterflies, bees, and wasps.

Over the last several years, conservation partners have collected seed, conducted research, and reintroduced the plant on Tingle Prairie Natural Area and Cover Prairie Conservation Area, both in Howell County. They have also conducted extensive survey work and habitat management. Thanks to these actions, USFWS is now considering removing Virginia sneezeweed from the threatened species list.

“We learned from the study where we needed to be looking for the plant,” said Department Natural History Biologist Rhonda Rimer.

“Many of our landowners are cattle producers, and they let us on their land. We discovered that they were actually spreading the plant with their haying.”

In addition to the Department, conservation partners include the Center for Plant Conservation, Missouri Botanical Garden, USFWS, Washington and Lee University in Virginia, numerous volunteers, and over 100 private landowners.

What You Can Do

These four profiles illustrate the kinds of actions conservation partners are taking on behalf of caves and cave life throughout Missouri’s karst region. If you’re curious about Missouri’s mostly hidden habitat, explore karst geology, get to know the plants and animals that depend on it for survival, and take care when visiting, building, or living atop karst topography. Learn more about karst habitat at short.mdc.mo.gov/Z4w. ▲

Bonnie Chasteen is associate editor for the Missouri Conservationist. An all-around nature nerd, she enjoys exploring how geology shapes natural and human communities.

Cave Responsibly

Although all Department caves are closed to public access, you can still find several public and private caves in Missouri that are open to visitors. Whenever you visit a cave, avoid touching surfaces, and always clean your clothes, shoes, and gear between cave trips. This helps prevent the spread of white-nose syndrome (WNS), which is a disease fatal to cave-dwelling bats, and other pathogens that could infect sensitive cave life. If you want to get involved in caving, find and join a state or local caving organization that is also devoted to cave and karst conservation. A quick internet search will get you started.

Be Careful Building Near Caves and Karst

If you’re building in one of the counties shaded on the map on Page 16, there is potential for your project to lie above karst. Be careful about storing or disposing of chemicals, waste, or trash, and protect streams during your building process. For our free online publication, *Building on Karst Best Management Practices*, visit short.mdc.mo.gov/Z4k.

Become a Karst Keeper

If you own land in Missouri’s karst regions (see map on Page 16), you may be eligible for special conservation cost-share funds and technical support. Call your private land conservationist or regional forester to learn more. Find regional phone numbers on Page 3.

You don’t have to be a landowner to get involved in karst habitat conservation. You can volunteer with your local Department office, another government agency, or a nonprofit group working with active cave and karst conservation projects. Search the internet for conservation partners listed in this story to find opportunities in your interest area or part of the state.



Missouri is the Cave State



With more than 6,300 caves identified in 78 of the state's 114 counties, Missouri deserves its moniker, "The Cave State." Caves form over the eons as acidic rainwater dissolves limestone and dolomite bedrock to create caverns below the surface. Missouri has five primary karst regions where caves form: Hannibal Karst, St. Louis Karst, Perryville Karst, Salem Plateau, and Springfield Plateau. These mysterious, mostly unseen landscapes harbor some of the state's rarest, most sensitive wildlife. Safeguarding caves, karst, and the wildlife that depend on them also safeguards a major source of drinking water for many Missourians.

Missouri's KARST RANGE



We're Talking Karst

- Although the word *karst* comes from Slovenia's stony, barren Krs region, Missouri's karst landscape appears much softer and its features can be hard to detect. Sudden depressions or crevices in otherwise smooth ground can indicate sinkholes.
- A sinkhole "throat" is called a "swallet" or "swallow hole."
- If a stream disappears underground and reappears farther along the basin, it's known as a "losing stream."

Plants and Animals of Greatest Conservation Need



Grotto salamander



Bristly cave crayfish



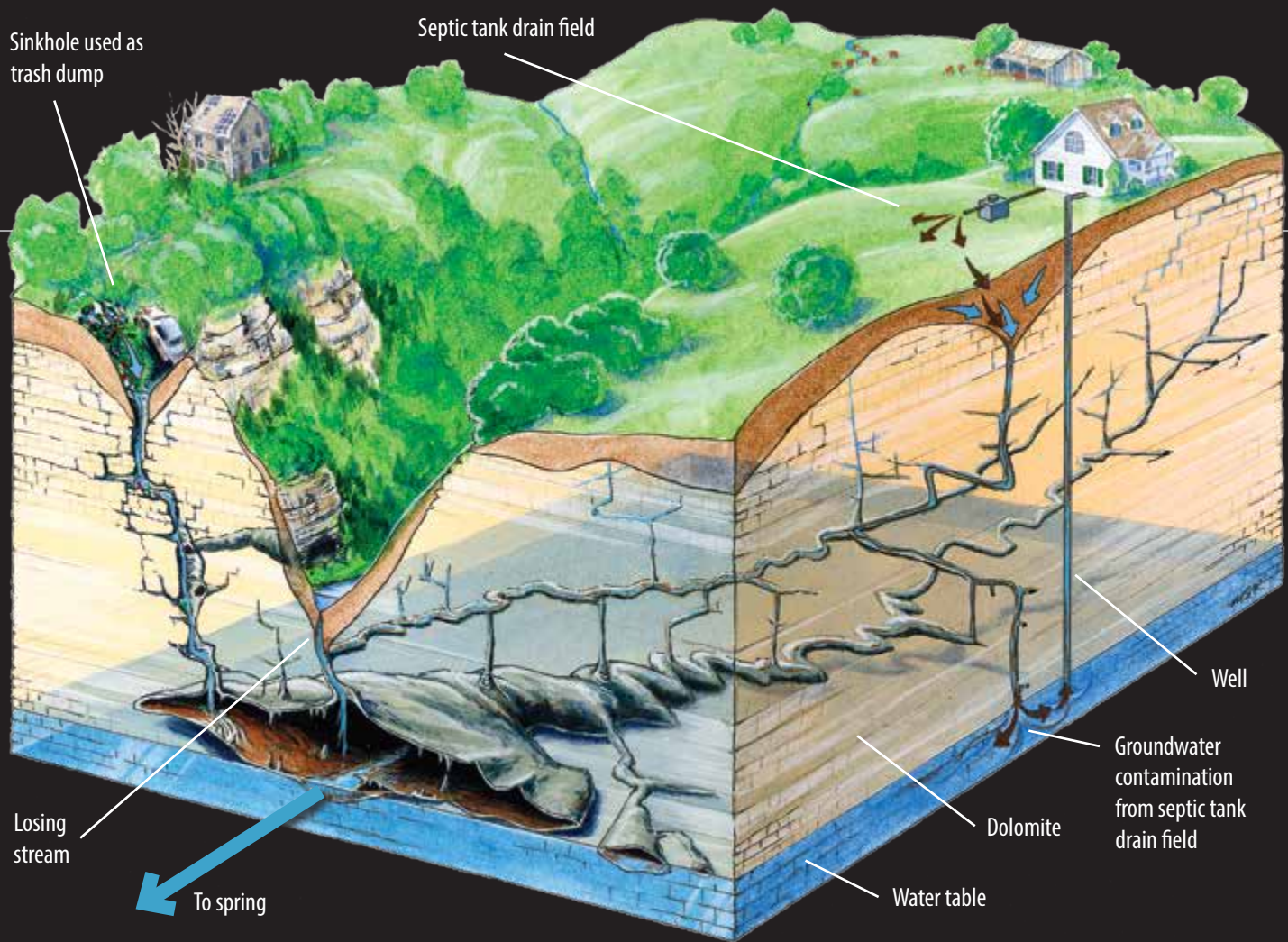
Whorled water pennywort



Gray bat



Straw sedge



Threats to Caves and Karst

Pollution, Dumping, and Pumping

Aquifers are bodies of saturated rock through which water can easily move. Chemical runoff, sewage, and over-pumping of karst aquifers can foul or eliminate groundwater and kill off aquatic life.

Human Disturbance

Visiting caves can damage their physical features and distress resident wildlife.

Invasive Species

Whether intentional or accidental, introducing species from one region to another can threaten native plants and animals in the new location. This happened when heavy rains flooded pools at Bull Shoals Lake, giving the native ringed crayfish access to Tumbling Creek Cave, where it threatens the endangered Tumbling Creek Cave snail.

Actions We're Taking

Managing Cave Recharge Areas

Groundwater gets replenished when stormwater enters a sinkhole or cave. This is also known as "recharge." To protect these recharge areas, the Department maintains or establishes native plant buffers around caves, sinkholes, and streams.

Preventing Human Disturbance

White-nose syndrome appeared in Missouri's bat populations in 2010. Humans can spread the fungus that causes this bat-killing disease on their clothes and gear. Therefore, all Department caves are now closed to public access except for specific research, survey, monitoring, and mapping visits.

Surveying and Monitoring Cave Life

The Department regularly conducts bat surveys to track abundance and distribution, with a focus on federally listed species, such as the northern long-eared bat. In conjunction with these surveys, the Department participates in major studies related to WNS.

Monitoring Water Quality

The Department uses water-quality monitoring to evaluate management actions designed to improve groundwater quality in karst regions, such as well caps, sinkhole cleanouts, spring exclusions, restoration of riparian buffers, and sedimentation reduction. These monitoring efforts also help us evaluate benefits to species such as the grotto sculpin and spring cavefish in southeast Missouri and the Ozark cavefish in southwest Missouri.



QUAIL HUNT *at* COVER PRAIRIE

BY SCOTT SUDKAMP | PHOTOGRAPHS BY DAVID STONNER

A trip to this quail emphasis area takes you back to Missouri's quail-hunting good old days



From left: Rusty and Russ Doughty, along with Cory Purgason, hunt for quail at Cover Prairie Conservation Area with Brittanies Sage and Pearl.



A 12-GAUGE REMINGTON 870 Magnum is relatively heavy, and most quail hunters wouldn't choose it for a long day chasing bobwhites. But one glance at the gun told me it had a storied history. The bluing was all but gone from the receiver, and the stock had long ago lost its factory finish. This veteran bore the scars of countless hours afield, and it was clear that it often encountered thorns and barbed wire. It hadn't been neglected, but it had been used hard. Rusty Doughty pulled the gun from its case as his dad, Russ, slipped shells into the pockets of his game vest. I soon learned that Russ's wife had given him the gun for Christmas back in the late '80s. Sometime in the '90s, Rusty had borrowed it for a turkey hunt, and now, 20 years later, it was still on loan. Russ had since resigned himself to Rusty's claim on the old pump gun, and though they teased each other over the "theft," it was obvious both men were content with Rusty's possession, if not ownership. The father and son shared more than 70 years combined experience hunting quail, and this battered old shotgun was part of their tradition.

It's All About the Dogs

About the time the Doughtys had finished their coffee, another truck with a dog box in the back wheeled into the parking lot at Cover Prairie Conservation Area (CA). Cory Purgason is a friend of the Doughtys, and he'd brought Pearl and Sage, both Brittanies, to join the hunt with Rusty's dog, George — also a Brittany and nephew to Pearl. With guns loaded, the trio set out with Pearl and Sage. George would remain in the truck for now, and would get his chance to hunt later. With the temperature in the low 40s and overcast skies, the weather was ideal to create damp conditions that boded well for the dogs' ability to catch wind of a covey.

The hunters took their time following the dogs, which cast back and forth through the

The Doughtys' 12-gauge Remington 870 Magnum is a treasured part of their quail-hunting tradition.



Large patches of native grass interspersed with clumps of sumac, plum, blackberry, and scrub oak give quail plenty of places to hide.

native grass and brier thickets. Pearl showed a lot of interest in a plum thicket at the bottom of a wide draw, and her short tail wagging furiously told us something had been here, if it wasn't still. The dogs didn't point, however, and as the hunting party climbed the slope above the draw, both dogs disappeared over the crest of the hill. A few minutes later, the dogs hadn't checked back, and Rusty and Cory hurried to the top just in time to see a handful of quail flush wild from a thicket. The dogs had pointed, but the birds got nervous and flushed before the hunters could get in position for a shot. I checked my watch. It had been only 20 minutes since we left the truck, and we'd found birds less than 100 yards from the parking lot!



The Dan and Maureen Cover Prairie Conservation Area is a 736-acre tract located in Howell County.

A Model of Quail Habitat Management

The Dan and Maureen Cover Prairie Conservation Area is a 736-acre tract located in Howell County just a few miles from Koshkonong. Dan Cover purchased the property in 1988. Prior to his purchase, it had been cleared and used for raising hogs. Upon purchasing the tract, Cover set about restoring it to usable wildlife habitat, planting native grasses, removing exotic species, and using prescribed fire to create the conditions quail and other wildlife need.

In 2001, Cover donated the property that would bear his name to the Missouri Department of Conservation. Today, Department staff use management efforts similar to those Cover used. Prescribed fire is the primary tool Department staff use to maintain habitat structure and species composition. Invasive exotic plants

are a constant challenge to effective management, and Department employees spend considerable time controlling them in an effort to increase natural diversity on the area. The abundant native little bluestem, broomsedge, blackberry, and sumac create a tapestry of plant cover suitable for quail, and the dry, rocky soil, combined with prescribed fire, results in an abundance of native foods for quail and many other species. In fact, there is not a single acre of planted food plots on this area, or even within sight of it, a testament to the land's ability to support wildlife with proper management.

A Taste of The Good Old Days

While the dogs continued their search for the elusive bobwhites, I had a chance to talk more with the hunters. Having hunted quail since the 1970s, Russ told me that when he started, quail — Missouri's state game bird — were common. In southeast Missouri, where he lived at the time, he and his partners would hop from farm to farm, and it wasn't uncommon in those days to find 10 or 12 coveys in a day's hunt. Then, with a touch of sadness in his voice, he recounted seeing the first signs of trouble in the early '80s, watching a bulldozer clear an entire hillside to make way for a field of soybeans. That was just the beginning of what would be a long, gradual decline in Missouri's quail. By the late '80s, bobwhites had become scarce enough that Russ quit hunting them, preferring to remember things as they had been. But about six years ago, Rusty, remembering some of those early hunts and the many stories of dogs and guns and birds, started quail hunting again, and it didn't take much effort to convince the elder Doughty to join him.

Russ commented that the habitat on Cover Prairie CA reminded him of what much of the Missouri Ozarks once looked like — large patches of native grass interspersed with clumps

of sumac, plum, blackberry, and scrub oak. "Predators

can get a bird or two," Russ said, "but habitat loss wipes out whole coveys at a time."

As we looked at the habitat blanketing the Ozark hills, it was apparent that any quail on this area had a lot of places

Habitat on Cover Prairie provides quail with abundant cover to hide, nest, and raise their young.



“Predators can
get a bird or
two, but habitat
loss wipes out
whole coveys
at a time.”
—*RUSS DOUGHTY*





Although opportunities to hunt quail have declined, places like Cover Prairie give people chances to hunt good cover with family and friends.

to hide, nest, and raise their young. Rusty commented that while they had hunted here before and always found plenty of birds, the hunting experience is different on Cover Prairie than on most private farms and even other public areas. Here the entire landscape is habitat compared to traditional farm settings where the birds and the hunters tend to stick to brushy fencerows and other narrow patches of cover. All the habitat here makes the hunting tough, he observed, because the birds can be anywhere.

“I’d rather leave my gun ...”

The Doughtys had hunted Cover Prairie just the weekend before and found three coveys in a morning’s hunt. But this morning the quail were proving elusive, despite Pearl and Sage’s efforts. “Look at this cover,” Rusty said. “Everything is scrubby, brushy, and thorny. The birds can move through it easy, but not much else can.”

After a few more hours, we had looped back to the trucks. It was nearly lunchtime, and while the walk had been pleasant, it felt good to sit for a few moments.

When asked what he considered a good day quail hunting, Rusty never hesitated with his reply. “One pointed covey is good. Three coveys is excellent.”

HUNTS BY SPECIAL PERMIT AVAILABLE EVERY FALL

Cover Prairie is a designated quail emphasis area (QEA), meaning that extra efforts are taken there to create and maintain habitat beneficial to bobwhites. In an effort to control hunting pressure on this small area, Department staff conducts hunts by special permit only. No other Department QEA requires a special permit to hunt quail. Anyone can apply for the Cover Prairie hunt, and a hunter who gets drawn can include up to three other hunters in his or her party. Two hunters are selected per week for the entirety of the statewide quail season, and groups may harvest no more than four birds per party. Applications for the hunt are accepted Sept. 1 through Sept. 30 each year, with a drawing held on Oct. 1. Hunters may hunt on their own card and may hunt with another drawn party, but they may not hunt more than twice in a season. In addition to managed quail hunts, Cover Prairie is open to the public for hiking, nature viewing, and scouting. Also, Cover Prairie supports good numbers of cottontail rabbits, and it is open for rabbit hunting during that portion of the rabbit season outside the quail season dates. For more information on the Cover Prairie Managed Quail Hunt, contact the Ozark Regional Office (phone number on Page 3).

Time and change have been cruel to this popular game bird, and opportunities to hunt quail have declined. But places like Cover Prairie and people who are working to restore quail habitat on their own land give us hope that hunters will continue to have chances to hunt good cover with family and friends. And while I’m sure there was some disappointment in not finding more birds, it was obvious the younger Doughty shared his father’s earlier sentiment when he said, “If I had to leave something at home, I’d rather leave my gun than the dog.” A remarkable statement and strong testament, considering the history and memories that battered gun holds for this family. ▲

***Scott Sudkamp** is a private land conservationist for Vernon and Bates counties. In addition to assisting landowners with their habitat-improvement projects, he enjoys managing wildlife on his own farm and hunting quail, deer, turkey, and ducks with friends and family.*

Discover Nature SCHOOLS

A WINNING PROGRAM FOR MISSOURI TEACHERS,
STUDENTS, AND THE FUTURE OF CONSERVATION

STUDENTS ON A DISCOVER
NATURE SCHOOLS PROGRAM
HIKE IN ST. LOUIS



BY **DAN ZARLENGA** PHOTOGRAPHS BY **DAVID STONNER**

MAYBE IT'S THE INTIMACY OF WATCHING A distant bird up close through binoculars. Perhaps it's the satisfaction of identifying a new flower on your own. It could be the fascination of examining a tiny invertebrate that came from an alien world of soil. It might even be coming face-to-face with the cackle of a Canada goose. To a student on a path to

discover nature, these experiences are worth a thousand textbooks.

There's a lot of talk about win-win scenarios. One program that truly embodies the win-win scenario is the Missouri Department of Conservation's Discover Nature Schools program (DNS). In fact, it could be said that Discover Nature Schools is a triple win — a win for teachers,



An integral part of each Discover Nature Schools unit is taking students outdoors to encourage their own explorations of nature.

a win for their students, and ultimately a win for Missouri's fish, forest, and wildlife resources.

Recognizing that kids of today are the conservationists of tomorrow, the Department has always made it a priority to furnish schools with quality educational materials. Starting in 2006, the Department made a concerted effort to take things to the next level. The new goal was to develop a set of educational units that featured age-appropriate content from preschool through high school.

Beyond simply teaching conservation content, these units would also be relevant in science education, aligning with the most current standards set forth by the Missouri Department of Elementary and Secondary Education, which most schools are required to follow. In addition, these units had to adhere to best educational practices and be captivating and engaging for students. Finally, they had to connect specifically with Missouri students.

The result was the Discover Nature Schools program.

"It's one of the few instructional units available that provides teachers with the tools necessary to help kids learn about Missouri plants and

animals," said Kevin Lohraff, the Department's Education Programs/Curriculum Supervisor. "It focuses on what's happening right outside their door."

DNS is broken down into five progressive instructional units covering grades Pre-Kindergarten-12. Complete instructional materials are made available to teachers through the program. These include comprehensive teacher guides, full-color student books, and science notebooks. In-person training is also offered for teachers using DNS units by way of the Department's education consultants. All units are free to participating schools, and DNS grants pay for exploration equipment used to teach the units and transportation costs for field investigations.

DNS is founded on place-based and experiential learning. An integral part of each unit is taking the students outdoors to encourage their own explorations of nature.



Education Consultant David Bruns facilitates Forder Elementary students in forest investigation at Clair Gemp Davidson Memorial Wildlife Area near St. Louis.



Fourth-graders at Hancock Place Elementary in St. Louis County work on the *Nature Unleashed* unit from the Discover Nature Schools curriculum.



“Learning outdoors is one of the fundamental philosophies of DNS,” Lohraff said. “It uses hands-on and inquiry-based learning, which helps develop higher-order thinking skills.”

DNS offers teachers high-quality educational units that fit the science objectives they are required to teach, and at no cost to the schools.

Take Home Lessons

“I was really excited about the DNS program when I first heard about it because it took what I used to do and all my personal interests, and let me do that in the classroom,” said Heidi Qwentus. “And if kids can see that as a teacher you’re really interested in something, it’s just going to make them more interested.”

Qwentus is a fourth-grade teacher at Forder Elementary School, which is in St. Louis County’s Mehlville School District. She adopted the DNS *Nature Unleashed* unit, and has been teaching from it for four years.

“Kids are really in tune with how you feel about what you’re teaching. They know the outdoors is part of who I am,” she said.

The fact that DNS teaches kids about what’s in their own backyards is one of the things that drew her to the program.

“It’s not until something is personal that kids start to care about what they’re learning, like when they can identify different organisms because they’ve seen them and know they’re in the area,” said Qwentus.

Her classes are usually broken up into tables of four, and students conduct small group discussions and activities with partners. She has the students pick an organism that looks interesting to them. Then the students go outside for field experiences. Once there, students observe how the chosen organism

interacts with its environment, recording it all in their DNS student books. They translate what they’ve learned in the classroom to what they see in the real world.

“The DNS field guides give kids the opportunity to investigate themselves and learn about things that are right in front of them,” she said. “The science notebook gives kids enough freedom, and they’re not restricted by fill-in-the-blanks, quizzes, and worksheets.”

With its emphasis on outdoor learning, Qwentus also appreciates that DNS offers reimbursement for transportation costs to take students to an outdoor destination like a conservation area. She takes her students to the Department’s Claire Gempp Davidson Memorial Wildlife Area in nearby Sunset Hills. This 13-acre area demonstrates all three habitats covered in the *Nature Unleashed* unit — forests, prairies, and ponds.

She sees these field investigations as teaching kids about what’s in their own backyards.

“When they really get to focus with a magnifying glass and look at an ant or something, it’s really cool to see them block everything else and just focus on that bug,” said Qwentus. “And the kids you might not peg as outdoor kids are just completely absorbed in that tiny thing in front of them.”

Qwentus said she felt the training she received from Department Education Consultant David Bruns was invaluable. She said that teachers new to the program shouldn’t be intimidated about learning how to teach it.

“I got to go on the field experience myself with David and got to be the student,” she said. “There are not a



lot of times we get that opportunity as teachers. Having the tables flipped really helps us teach it better because we get to see through our students' eyes."

Qwentus gives her students tests on the material both before and after teaching a *Nature Unleashed* unit. Pre-test scores average about 51 percent, while post-test scores average 84 percent. She said the results are consistent from year to year.

Perhaps the biggest testimony comes from the students themselves.

"Kids are excited to be able to take the *Nature Unleashed* student guide home at the end of the unit," said Qwentus. "It's neat that they want to keep something."

What We've Wanted for Years

One of the things Spencer Storey saw lacking in elementary education was science. Like Qwentus, Storey is a teacher using the DNS *Nature Unleashed* unit. He teaches fourth grade at Hancock Place Elementary in the Hancock Place School District of St. Louis County. This past year was Storey's first year with DNS.

Storey had talked for years with a friend and colleague about putting a program together that would get kids outside. That same friend, who now teaches the DNS eighth-grade unit, introduced Storey to the program.

"This program has really been a chance to incorporate more science, and get the kids excited about it because we get to go outside and actually explore things," said Storey. "It makes them want to grasp the information more."

Despite a high-quality curriculum, Storey admits it might have been a hard sell to his principal were it not for the Department's financial support for the program, which includes grants to cover costs for the equipment needed.

"That was one of the big selling factors. If I had to pay for this myself, I wouldn't be able to do it," he said.

The DNS unit focuses on plants and animals found in his students' home state, which impresses Storey. These are the plants and animals they will likely see when camping, on a trip to the lake, or maybe in their own backyard.

"The most powerful example is identifying poison ivy," Storey said. "We went really in-depth as to what it looks like, beyond the old 'leaves of three' saying. We talked about other characteristics like the red vines. One of our activities when we got outside was identifying it. It was immediate — they knew what it



The Discover Nature Schools program inspires curiosity and first-hand investigations of how nature works.

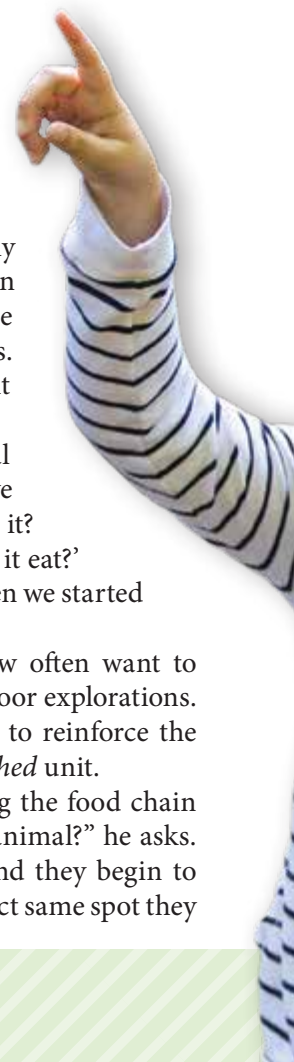
was right away."

While plants and animals naturally fascinate kids, there can be a certain amount of fear of the outdoors for those kids who are new to these experiences. He's seen the *Nature Unleashed* unit transform fear into curiosity.

"Instead of being afraid of an animal or wanting to kill an insect, the kids have learned to ask, 'What kind of bug is it? What can we learn about it? What does it eat?' That was an interesting switch I saw when we started doing this program," said Storey.

In fact, Storey said his students now often want to keep insects they find during their outdoor explorations. However, Storey takes the opportunity to reinforce the food chain lessons of the *Nature Unleashed* unit.

"If we take it away, are we disrupting the food chain and taking a meal away from another animal?" he asks. "That makes a connection for them, and they begin to want to put everything back into the exact same spot they



found it to conserve what they found.”

Storey said he is fortunate to be able to conduct some of the outdoor investigations on the school grounds. However, he also appreciates the opportunity the Department provides to get his students to the Gempp Davidson Conservation Area.

“We do a lot of outdoor activities at our school but could only do so much,” said Storey. “We don’t have a pond, for example. We talked about pond animals, so as soon as we got out there, that was one of the spots they enjoyed the most because we just didn’t get to see it before.”

He said once they started taking water temperatures and seeing the animals around the pond, it was a totally different atmosphere from being at school.

Storey said he gives students assignments, like finding an interesting leaf and sketching it in their DNS science notebooks. He then allows them the freedom to complete the assignment on their own time. It lowers barriers and gives them the independence to customize their own experience. “They take more ownership of it,” he said.

Like Qwentus, Storey has also taken advantage of Education Consultant David Bruns’ assistance in getting up to speed with DNS.

“David was great with this. He comes along for the first trip, letting me know he’s here to help out, but I’m the one in charge,” said Storey. “It was great to have him there to answer questions and such.”

Storey praises the DNS materials, too. He pointed out that his kids love the student books because of their glossy, color pages.



DISCOVER NATURE SCHOOLS BY THE NUMBERS

Discover Nature Schools is built on five educational units, each consisting of age-appropriate content and aligned with the state Grade and Course Level Expectations. They include, by grade level:

- » *Preschool: Nature Revealed*
- » *K–2: Nature Unfolds*
- » *3–5: Nature Unleashed*
- » *6–8: Conserving Missouri’s Aquatic Ecosystem*
- » *9–12: Nature Unbound*

DNS is also available for homeschool groups.

The program is now used in **100 percent** of Missouri school districts and in **1,627 public and private schools**. This accounts for **53 percent** of the total number of schools in Missouri.

DNS reaches over **75,000 students** per year, and nearly **400,000 students** have gone through the program since its inception in 2006.

The Department’s education consultants make DNS happen on the local level. They continually provide workshops and support for teachers in the DNS “train the trainer” model. For more information on DNS, including grants available for transportation and field experiences, workshops, and sample units, visit short.mdc.mo.gov/ZZ4. For local contact information, visit short.mdc.mo.gov/Z44.

“The illustrations and color catch them right away,” he said.

He said students get especially excited about the ID illustrations for each of the three habitats the unit covers. They enjoy finding the plants and animals in the illustration and identifying them with the key off to the side. “It’s like a game for them,” said Storey.

“This is exactly the kind of program my friend and I have been wanting for years!”

Stewards of Tomorrow

One of the biggest goals of DNS is to help kids move through a “stewardship model.” That model takes students from an initial interest and curiosity, all the way through to acting and behaving on behalf of conservation for the long term.

“In the end, we want them to not only see that our actions make a difference, but to take those actions on their own to promote healthy and sustainable fish, forests, and wildlife and the ecosystems they depend on,” said Lohraff.

It’s the triple win that will create the conservationists of tomorrow. ▲

Dan Zarlenga is the Department’s media specialist for the St. Louis Region. He likes to discover nature mostly through hiking, backpacking, photography, and an occasional float trip.

Dogday Harvestfly

SUMMER IS HERE, and so is the heat and humidity. Soon you might hear a familiar buzzing in the air, similar to an electric saw. If you do, it may be a dogday harvestfly, also known as a dog-day cicada (*Neotibicen* sp.). The dog-day cicada is a genus of annual cicada, which includes several very similar species. This insect gets its name because it's seen and heard during the dog days of summer when it's hot and muggy.

Adults are mostly black with green markings. They have prominent bulging eyes and semitransparent wings held roof-like over their large body. The body size is typically about 2 inches. In Missouri, there are seven species of periodical cicadas, which emerge every 13 or 17 years. They are smaller and emerge in larger numbers.

During the peak of summer from July–August, male dog-day cicadas rest on tree trunks and branches and sing to attract nearby females. The males produce a sound with a high-pitched whine much like an electric saw. This sound comes from two special vibrating membranes in the sides of the abdomen. The buzzing sound lasts for several seconds before fading away. Females do not sing. Depending on the number of cicadas, the sound can be incredibly loud. I remember several years ago when a massive number of periodical cicadas emerged, the sound produced by the thousands of cicadas vibrated the air around me like a drumbeat.

After mating, a female dog-day cicada will insert clusters of eggs into tree branches. In six to seven weeks, small nymphs begin to hatch from the eggs and drop to the ground where they continue to burrow into the soil, seeking tree roots as a food source. Nymphs will continue to feed on the trees and roots, but they are not considered to be plant pests. As they go through several molting processes, they will continue to burrow deeper. Nymphs live underground for three years, and when they are fully developed, they burrow out of the ground at night and climb onto the tree trunk. Adult cicadas emerge from this last stage through a crack along their back, leaving the light brown cast skin behind. Adults live only for five to six weeks, focusing their energy on mating and reproducing.

I've seen many shell skins of dog-day cicadas on the ground or on tree trunks, but I never found a live nymph until last summer when I found one still in its shell on a tree trunk. I didn't have to wait long before the nymph shell began to crack open and within minutes a rather soft, pale-green cicada crawled out of its cast skin and rested until its wings hardened.

The emerging process takes only a couple of minutes, so in order to witness this final phase, you almost have to be at the right place at the right time. But if you happen to find one, it is surely one of the most interesting things to observe in nature. My daughter still talks about this experience every time she hears the cicada sound.

These noisy insects are truly harmless and become an important food source for many other animals that feast on their abundance throughout the summer months. If the flowering dogwood is the first sign of spring, then the sound of a dogday harvestfly is the sign of the peak of a hot summer.

—Story and photograph by Noppadol Paothong

📷 100mm macro lens • f/16 • 1/250 sec • ISO 200



We help people discover nature through our online Field Guide.

Visit mdc.mo.gov/field-guide to learn more about Missouri's plants and animals.



Burr Oak Woods Conservation Area and Nature Center

Located just a few miles from downtown Kansas City, this urban conservation area and nature center provides indoor and outdoor opportunities to beat the heat and discover nature.

BURR OAK WOODS Conservation Area and Nature Center in Jackson County is a 1,072-acre jewel positioned in the center of a growing suburban area. The nature center is a state-of-the-art facility with interactive exhibits, a children's play area, a 3,000-gallon aquarium, and live reptiles and amphibians. Visitors will love participating in a wide variety of monthly programs and special events that help families discover nature.

The conservation area showcases the variety of natural habitats unique to Missouri and boasts six hiking trails to explore. The Bethany Falls Trail is award-winning due to its intriguing maze of rock outcroppings of Bethany Falls limestone. The trail has been featured in *Backpacker* magazine and was also voted the No. 1 trail in Kansas City.

Burr Oak Woods Conservation Area and Nature Center is located 20 miles east of downtown Kansas City. The land was purchased in 1977, and the nature center is the first of its kind in the state, built in 1982.

The history of the area dates back to the Civil War and was the site of guerilla warfare along the Missouri-Kansas border. William Quantrill, a Confederate, and his men camped on the Burr Oak Woods property many times while hiding from the Kansas Jayhawkers militia during the war.

The conservation area prides itself on the unique wildlife viewing opportunities it has



24–70mm lens • f/4 • 1/160 sec • ISO 640 | by David Stonner

created with a matrix of habitats and food sources, including native grassland restorations, food plot demonstrations, and healthy forested areas. The area is an urban oasis that provides visitors with the opportunity to experience nature close to Kansas City.

—David Doyle, area manager



Burr Oak Woods Conservation Area and Nature Center

Recreation Opportunities: Wildlife viewing, hiking, bird watching, nature center exhibits

Unique Features: Limestone outcrops, native grassland, forest, food plots

For More Information: Call 816-228-3766 or visit mdc.mo.gov/a7812



MDC

DISCOVER nature



To find more events near you, call your regional office (phone numbers on Page 3), or visit mdc.mo.gov and choose your region.

TEENS FOR CONSERVATION: ARCHERY

AUG. 11 • THURSDAY • 9 A.M.–12 P.M.

*Central Region, Runge Conservation
Nature Center, 330 Commerce Drive,
Jefferson City, MO 65109*

Registration required, call 573-526-5544

Ages 13–17

National Archery in the Schools Program (NASP) is an effective way to teach archery and is used in many of our local schools. We will be using the NASP method for this introduction to the sport of archery. Instruction will begin indoors, and then we will spend time outside testing our archery skills.

FLOATIN' ON THE RIVER

AUG. 12 • FRIDAY • 6–7:30 P.M.

AND AUG. 13 • SATURDAY • 7:30 A.M.–2:30 P.M.

*Southeast Region, Cape Girardeau
Conservation Nature Center, 2289 County
Park Drive, Cape Girardeau, MO 63701*

Registration required, call 573-290-5218

Ages 16 and older

Enjoy a float from Trail of Tears State Park to Red Star Access on North America's largest river — the mighty Mississippi. Eat lunch on a sandbar and explore the river with expert guides. This is for experienced paddlers only, and participants must attend the Friday night session about navigation, river flows, hazards, and other important information in order to participate in the float.

INSECT-O-RAMA

AUG. 19 • FRIDAY • 6:30–9:30 P.M.

*Southwest Region, Springfield Conservation
Nature Center, 4601 S. Nature Center Way,
Springfield, MO 65804*

*No registration required, call 417-888-4237
for more information*

All ages

Grab your family and stop by for some creepy-crawly fun for all ages during this annual celebration of insects and the important role they play.

REPTILES OF THE MARAIS TEMPS CLAIR CONSERVATION AREA

AUG. 20 • SATURDAY • 8–11 A.M.

*St. Louis Region, Marais Temps Clair,
north of St. Charles on Highway 94 to
Route H, St. Charles, MO 63304*

*Registration required, call 636-441-4554
starting Aug. 8*

All ages

Join us for a 2.5-mile hike on the levees at Marais Temps Clair to view reptiles and other native wildlife of eastern St. Charles County.

CREATURE FEATURE: ANIMAL ASSASSINS

AUG. 24 • WEDNESDAY • 3:30–4:30 P.M.

*Northeast Regional Office, 3500 South
Baltimore St., Kirksville, MO 63501*

*No registration required, call 660-785-2420
for more information*

Ages 7–12

Humans aren't the only animals that hunt. To eat, wild predators must catch their dinner. And, though they don't have firearms, animal assassins are armed to the teeth. Join us to learn about some of the amazing adaptations animals have for capturing prey.

STREAM TEAM FOR FAMILIES

AUG. 27 • SATURDAY • 12:30–3 P.M.

*Kansas City Region, Burr Oak Woods
Conservation Nature Center,
1401 NW Park Rd., Blue Springs, MO 64015*

Registration required, call 816-228-3766

Families, ages 8 and older

Do you wonder what Missouri Stream Team is all about? Join us for a hands-on program where you will have the opportunity to sample Burr Oak Creek. We will check water chemistry, look for water bugs, and explore the stream bed and surrounding watershed. It's fun and science combined in a wet and wild way.

OVERNIGHT FLOAT

AUG. 27–28

SATURDAY • 9 A.M. – SUNDAY • 5 P.M.

*Ozark Region, Twin Pines Conservation
Education Center, RT 1 Box 1998,
Winona, MO 65588*

*Registration required, call 573-324-1381
for more information*

Families, 12 and older

Discover nature by spending two days on the Current River with a naturalist guide.



Subscribe online • mdc.mo.gov/conmag • Free to Missouri households



I Am Conservation

"At 86 years of age, Edith Johnson is one of the most energetic people I know," said John Pinkowski, Missouri Department of Conservation private land conservationist. Pinkowski works with Johnson to improve habitat on her property, including native grass and wildflower plantings, as well as dropping trees along fencelines to improve cover habitat for edge species like quail. "Quail is a favorite topic with Edith," said Pinkowski. She is an active member of the Clark County Quail Forever Chapter. She is also an avid bird watcher. "I probably spend more money on bird food than I do on my groceries," said Johnson. Pinkowski said that Johnson's views on conservation are simple. She hates to see waste in any form. "We need to think of future generations, not just the 'what's in it for me' attitude," said Johnson. "I don't like to do many public presentations, but if I sit down with a group of people, I like to bring up important topics for the group to discuss. That's how all good change takes place. We really need to get the word out about how important it is to manage our timber. I've done the work on my own farm and have seen the benefits." Pinkowski finds this attitude very gratifying. "Working closely with landowners and seeing many of them develop a deep love for conservation is one of the great joys of all private land conservationists." —*photograph by Noppadol Paothong*